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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,423	10/24/2005	Peter Andrin	DC8507 US PCT 1	3310

7590 05/01/2008

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EXAMINER	
LAIOS, MARIA J	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
05/01/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/550,423	ANDRIN ET AL.	
	Examiner	Art Unit	
	MARIA J. LAIOS	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 12-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,12-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This office action is in response to amendments filed on 7 January 2008. Claims 1-4, 12-13, 15-17, 19 have been amended. Claims 22-24 have been added.

Claim Rejections - 35 USC § 103

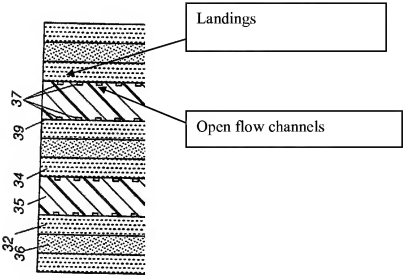
2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-4, 14-21, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (GB 2 326 017 A) in view of Sugita et al. (US 6,455,179 B1).

With respect to claim to claim 1, 4, 14 and 20-21, Davis discloses an electrochemical cell (fuel cell, as applied to claims 20, multiple cells are disclosed in figure 3, as applied to claim 21) comprising electrodes (32 and 34) with an electroconductive separator plate comprising at least one landing surface formed on a surface of the electroconductive separator plate, and the electroconductive separator plate and land surface comprising a thermoplastic polymer (page 5 lines 9 discloses the thermal plastic as polyamides as applied to claim 4) and a conductive filler (Page 4 lines 33, carbon fiber or carbon powder, as applied to claim 14) wherein the first surface of the gas diffusion layer is joined to the separator plate by localized impregnation of some of the thermoplastic polymer on the landing surface with in the pores of the porous body so the electrical contact between the filler and the electrode is maintained (Page 6 lines 6-8, as the bipolar plate becomes heated it will fuse with in the porous electrode. Davis fails to explicitly

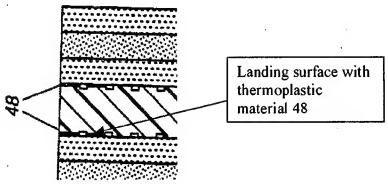
disclose that the porous electrode has a discrete gas diffusion layer. Sugita et al. discloses a fuel cell and teaches the electrodes (40, 42) are abutted to the gas diffusion layers (44, 46) which are abutted to the separator plate (34, 36) in order for the gases to diffuse through the layers. It would have been obvious for one of ordinary skill to include a gas diffusion layer of Sugita et al. to the porous electrode of Davis because this ensures an efficient entry passage for the gases. With respect to claims 2 and 3, Davis discloses the separator plate comprising landing surfaces separated by open flow field channels (see figure below) and discloses applying heat to fuse to the anode and cathode (Page 6 lines 5-7).



The product-by-limitations of claims 2 and 3, localized heating technique selected from the group consisting of: resistance welding, vibrational welding, ultrasonic welding and laser welding, are not given patentable weight since the courts have held that patentability is based on a product itself, even if the prior art product is made by a different process (In re Thorpe, 227

USPQ 964, 1985). Moreover, a product-by-process limitation is held to be obvious if the product is similar to a prior art product (In re Brown, 173 USPQ 685, and In re Fessman, 180 USPQ 324). Claim 2 and 3 as written does not distinguish the product of the instant application from the product of the prior art.

With regard to claim 15-17, Davis discloses a thermoplastic bipolar with a thin layer of thermoplastic material/polymer rich material (48, polyethylene or polypropylene) on top of the landing surface (Figure 4, shown below). Since the thermoplastic material is disclosed as polyethylene or polypropylene it is polymer rich at 100 weight percent polymer.

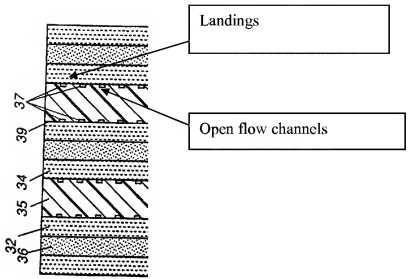


With respect to claim 18, the electrochemical cell component of Davis inherently has a resistivity less than a resistivity of a system comprising a gas diffusion layer that is not welded to the separator.

With respect to claim 19, Davis discloses fusing the bipolar plate to the MEA which would indicate that the gas diffusion layer does not sink into the open flow field channels of the separator plate (Page 6 lines 5-10).

With respect to claim 24, Davis discloses the separator plate comprising landing surfaces separated by open flow field channels (see figure below) Davis discloses fusing the bipolar plate

to the MEA which would indicate that the gas diffusion layer does not sink into the open flow field channels of the separator plate and local impregnation occurs (Page 6 lines 5-10).



4. Claims 12 and 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (GB 2 326 017 A) in view of Sugita et al. (US 6,455,179 B1) as applied to claim 1 above, and further in view of Takagi et al. (US 7,008,991 B2).

With regard to claim 12 and 13, Davis discloses the component as discussed above and incorporated herein but fails to disclose a blend of 1 to 30 or 5 to 25 weight percent of maleic anhydride modified polymer with a liquid crystalline polymer and fluorinated polymer. Takagi et al. discloses a thermoplastic resin composition with a composition of Component A, which is a thermoplastic resin such as styrene-maleic anhydride copolymer (col. 2 lines 26 and 27, styrene-maleic anhydride copolymer (col. 3 lines 14-36), Component B is a liquid crystal thermoplastic (col. 2 lines 46-47, col. 6 lines 23-26) and Components C and D are conductive

carbon black (col. 8 lines 12-17) which can be molded for materials that require conductivity (col. 10 lines 43-46). The amount of component A with respect to component B affects the mechanical strength and moldability (col. 9 lines 7-27). The amount of component A is 5-65 parts by weight and component B is 95 to 35 parts in 100 parts by weight of the two thermoplastic resins combined (col. 9 lines 15-20). Takagi does not disclose the specific range of 1-30 weight percent.

Davis and Takagi are analogous art because both are from the same problem solving area of using a molded resin compound for electrical conduction.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the polymer composition of Takagi in the fuel cell separator of Davis because the polymer compound of Takagi is suitable for molded components requiring excellent conductivity and strength. See MPEP 2144.07. *See In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).* The use of the resin for bipolar plate is a case of prima facie obviousness. *In re Sinclair, 325 U.S. 327, 65 USPQ 297 (1945).*

It would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the percentages of the two thermoplastic components (maleic anhydride polymer and liquid crystalline polymer) of Takagi through routine experimentation as the weight ratios affect mechanical strength and moldability. As to optimization results, a patent will not be granted based upon the optimization of result effective variables when the optimization is obtained through routine experimentation unless there is a showing of unexpected results which properly rebuts the prima facie case of obviousness. *See In re Boesch, 617 F.2d 272, 276, 205 USPQ 215,*

219 (CCPA 1980). The use of the resin for bipolar plate is a case of prima facie obviousness. *In re Sinclair, 325 U.S. 327, 65 USPQ 297 (1945).*

5. Claims 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (GB 2 326 017 A) in view of Sugita et al. (US 6,455,179 B1) and Takagi et al. (US 7,008,991 B2).

With respect to claims 22-23, Davis discloses an electrochemical cell comprising electrodes (32 and 34) with an electroconductive separator plate comprising at least one landing surface formed on a surface of the electroconductive separator plate, and the electroconductive separator plate and land surface comprising a thermoplastic polymer (page 5 lines 9) and a conductive filler (Page 4 lines 33) wherein the first surface of the gas diffusion layer is joined to the separator plate by localized impregnation of some of the thermoplastic polymer on the landing surface with in the pores of the porous body so the electrical contact between the filler and the electrode is maintained (Page 6 lines 6-8, as the bipolar plate becomes heated it will fuse with in the porous electrode. Davis fails to explicitly disclose that the porous electrode has a discrete gas diffusion layer. Sugita et al. discloses a fuel cell and teaches the electrodes (40, 42) are abutted to the gas diffusion layers (44, 46) which are abutted to the separator plate (34, 36) in order for the gases to diffuse through the layers.
It would have been obvious for one of ordinary skill to include a gas diffusion layer of Sugita et al. to the porous electrode of Davis because this ensures an efficient entry passage for the gases.

Davis modified by Sugita et al fails to disclose a blend of 1 to 30 or 5 to 25 weight percent of maleic anhydride modified polymer with a liquid crystalline polymer and fluorinated polymer. Takagi et al. discloses a thermoplastic resin composition with a composition of Component A, which is a thermoplastic resin such as styrene-maleic anhydride copolymer (col. 2 lines 26 and 27, styrene-maleic anhydride copolymer (col. 3 lines 14-36), Component B is a liquid crystal thermoplastic (col. 2 lines 46-47, col. 6 lines 23-26) and Components C and D are conductive carbon black (col. 8 lines 12-17) which can be molded for materials that require conductivity (col. 10 lines 43-46). The amount of component A with respect to component B affects the mechanical strength and moldability (col. 9 lines 7-27). The amount of component A is 5-65 parts by weight and component B is 95 to 35 parts in 100 parts by weight of the two thermoplastic resins combined (col. 9 lines 15-20). Takagi does not disclose the specific range of 1-30 weight percent.

Davis and Takagi are analogous art because both are from the same problem solving area of using a molded resin compound for electrical conduction.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the polymer composition of Takagi in the fuel cell separator of Davis because the polymer compound of Takagi is suitable for molded components requiring excellent conductivity and strength. See MPEP 2144.07. *See In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).* The use of the resin for bipolar plate is a case of prima facie obviousness. *In re Sinclair, 325 U.S. 327, 65 USPQ 297 (1945).*

It would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the percentages of the two thermoplastic components (maleic anhydride polymer and

liquid crystalline polymer) of Takagi through routine experimentation as the weight ratios affect mechanical strength and moldability. As to optimization results, a patent will not be granted based upon the optimization of result effective variables when the optimization is obtained through routine experimentation unless there is a showing of unexpected results which properly rebuts the prima facie case of obviousness. *See In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).* The use of the resin for bipolar plate is a case of prima facie obviousness. *In re Sinclair, 325 U.S. 327, 65 USPQ 297 (1945).*

The product-by-limitations of claim 23, localized heating technique selected from the group consisting of: resistance welding, vibrational welding, ultrasonic welding and laser welding, are not given patentable weight since the courts have held that patentability is based on a product itself, even if the prior art product is made by a different process (In re Thorpe, 227 USPQ 964, 1985). Moreover, a product-by-process limitation is held to be obvious if the product is similar to a prior art product (In re Brown, 173 USPQ 685, and In re Fessman, 180 USPQ 324). Claim 23 as written does not distinguish the product of the instant application from the product of the prior art.

Response to Arguments

6. Applicant's arguments, see Page 7, filed 7 January 2008, with respect to the rejection(s) of claim(s) 1 under USC 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Sugita et al. which discloses a gas diffusion layer.

With respect to the argument pertaining to claim 18, Davis discloses that the landing surface of the separator plate fuse with the porous electrode thus as applicant admits it will be less than not having welds.

With respect to the argument pertaining to claims 12-13 of Davis in view of Takagi.

7. In response to applicant's argument that the Takagi is not concerned with adhesion by locally impregnating, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARIA J. LAIOS whose telephone number is (571)272-9808. The examiner can normally be reached on Monday - Thursday 10 am -7 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJL

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795